Claims:

11. (Twice Amended) An apparatus for analyzing chemical species comprising:

a time-of-flight mass analyzer with an ion pulsing region and a detector,

an ion source for producing ions forming an ion beam from said chemical species,

a two-dimensional multipole ion guide having an entrance end where ions enter said ion guide from said ion source and an exit end where ions exit said ion guide,

said two-dimensional multipole ion guide functioning as a two-dimensional ion trap,

wherein said two-dimensional multipole ion guide comprises a plurality of spaced apart rods parallel to each other and extending from said entrance end to said exit end,

said ion beam having an axis thereof which is parallel to said spaced apart rods,

means for pulsing said ions transferred from said pulsing region into said time-of-flight mass analyzer for mass analysis,

and means for detecting said mass analyzed ions.

12. (Amended) An apparatus as set forth in Claim 11 comprising means to control the timing of said means for pulsing said ions transferred into said pulsing region.

13. (Never amended) An apparatus as set forth in claim 11, wherein said ions in said multipole ion guide are scanned at a scan rate sufficiently rapid to prevent excessive charge buildup in said multipole ion guide.